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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TABONE JR, JOHN J

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,299

Applicant(s)

WENDORF ET AL.

Examiner

John J. Tabone, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9, 12-16, 18-21, 23, 26-31, 34-37, 40-44, 47, 48 and 54-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 12-16, 18-21, 23, 26-31, 34-37, 40-44, 47, 48, and 54-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

FINAL DETAILED ACTION

1. The pending claims 1-7, 9, 12-16, 18-21, 23, 26-31, 34-37, 40-44, 47, 48, and 54-57 have been examined.

Response to Arguments

2. Applicant's arguments filed 4/19/2005 with respect to claims 1, 16, 30 and 44 have been fully considered but they are not persuasive.

Claim 1:

The Applicant states that "Miner does not teach or suggest a system having a first random access memory, a memory testing engine to execute test operations on the memory, a memory controller for accessing the memory a bus controller, a processor, and a bus that connects the processor to the bus controller". The Examiner asserts that it has already been established Miner teaches the limitation cited in claim 1 as set forth in the previous office action of record. Pertaining to the newly introduced limitation "a memory controller for accessing the memory a bus controller" the Examiner asserts that Miner teaches that the test execution logic 560 (MTE) directly interfaces to the memories 510 and to the bus controller 530, thereby allowing the memories 510 to be tested at full speed (MTE to execute test operations on the memory). Miner also teaches control logic 563 (memory controller) (note: this is part of the test execution logic 560 (MTE)) directly generates control signals over a memory control bus 564 to select and control bus a specified memory 510. (Col. 10, ll. 35-37).

It is the Examiner's conclusion that claim 1 as amended is not patentably distinct or non-obvious over the prior art of record in view of Miner (US-6370661 B1). Also, due to their dependency on claim 1, claims 2-7, 9, 12-15 stand rejected. Therefore, the rejection is maintained.

Claim 16:

The Applicant states that "This (Miner) does not teach or suggest a method where memory is accessed via multiple bus controllers, respectively, a plurality of random access memories are tested using memory testing engines, respectively, accessing from the processor the random access memories via the bus controllers, respectively, and accessing from the bus controller the random access memories using a number of memory controllers, respectively". The Examiner asserts that it has already been established Miner teaches the limitation cited in claim 16 as set forth in the previous office action of record. Pertaining to the newly introduced limitation "accessing from the bus controller the random access memories using a plurality of memory controllers, respectively" the Examiner asserts that Miner teaches that the test execution logic 560 (MTE) directly interfaces to the memories 510 and to the bus controller 530, thereby allowing the memories 510 to be tested at full speed (MTE to execute test operations on the memory). Miner also teaches control logic 563 (memory controller) (note: this is part of the test execution logic 560 (MTE)) directly generates control signals over a memory control bus 564 to select and control bus a specified memory 510. (Col. 10, ll. 35-37).

The Applicant states that "There is no teaching or suggestion that multiple memory controllers be provided in Miner such that a method according to claim 16 as amended here, could be practiced". The Examiner asserts it would have been obvious to one of ordinary skill in the art at the time the invention was made to duplicate Miner's test management logic 570 (BSC) and test execution logic 560 (MTE) in Figure 5. The artisan would have been motivated to do so since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8 (7th Cir. 1977).

It is the Examiner's conclusion that claim 16 as amended is not patentably distinct or non-obvious over the prior art of record in view of Miner (US-6370661 B1). Also, due to their dependency on claim 16, claims 18-21, 23, 26-29 stand rejected. Therefore, the rejection is maintained.

Claim 30:

As per Applicant's arguments "Miner does not teach or suggest accessing a memory associated with an ASIC via a bus controller, and configuring a memory test engine by writing to the controller over the bus, and processing a signal from the memory test engine that a test of that memory is complete". The Examiner asserts that it has already been established Miner teaches the limitation cited in claim 30 as set forth in the arguments and claim rejection of previous office action of record. In addition, the Examiner asserts that Miner teaches the testing of the memory chip 210 (ASIC) at full speed. Miner also teaches although the preceding discussion references testing of stand-alone memories (ASIC), it is now common practice to incorporate memory circuits

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into a more complex integrated circuit design (again, ASIC). Miner further teaches an apparatus 500 according to the present invention for testing memory circuits 510 in a microprocessor 501 (again, testing memories within an ASIC). (Col. 6, lines 49, 64-66, col. 9, lines 62-64). The Applicant also states, "Miner does not teach or suggest a utility bus slave controller". The Examiner asserts that a bus controller must be present, although not explicitly disclosed, because in communicating with a test controller 580 over the test control bus 575 the test management logic 570 must include a bus controller for the management and synchronization of these bused signals.

It is the Examiner's conclusion that claim 30 as amended is not patentably distinct or non-obvious over the prior art of record in view of Miner (US-6370661 B1). Also, due to their dependency on claim 30, claims 31, 34-37, 40-43 stand rejected. Therefore, the rejection is maintained.

Claim 44:

The Applicant states "Miner does not teach or suggest such structural components of a system, and neither does it teach or suggest modifications that would be deemed an equivalent under 35 U.S.C. 112, paragraph six". The Examiner asserts Miner teaches the means limitations in the amended claim 44 in that the test management logic 570 (MTE and bus slave controller) communicates with a test controller 580 (CPU, means for testing) over the test control bus 575. Miner also teaches the test execution logic 560 (MTE, means for testing the memories) directly interfaces to the bus controller 530, the test management logic 570 and the memories 510, thereby allowing the memories 510 to be tested. (See col. 10, lines 8-15).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, 5-7, 12, 13, 30, 34-36, 40, 41, 44, 47, 48, 54, 55 are rejected under 35 U.S.C. 102(b) as being anticipated by Miner (US-6370661 B1).

Claim1:

Miner teaches the limitation cited in amended claim 1 in that the test execution logic 560 (MTE) directly interfaces to the memories 510 and to the bus controller 530, thereby allowing the memories 510 to be tested at full speed (MTE to execute test operations on the memory). Miner also teaches the test execution logic 560 sends a test signal 565 to the bus unit 530 to preclude contention on the local bus 532, thus effectively disabling the bus unit during testing 530. (Col. 10, lines 12-15, col. 11, lines 21-24). Miner further teaches the test management logic 570 (BSC) communicates with a test controller 580 (processor) over the test control bus 575 (bus connecting processor to BSC). Miner also teaches the test management logic 570 (BSC) interfaces to test execution logic 560 (MTE) via bus 574. Miner further teaches control logic 563 (memory controller) (note: this is part of the test execution logic 560 (MTE)) directly

generates control signals over a memory control bus 564 to select and control bus a specified memory 510. (Col. 10, ll. 35-37).

Claim 30:

Miner teaches the use of a ROM 571 (machine-readable medium) for storing sequences of microinstructions and passes them from the test controller 580 (processor). Miner further discloses the test management logic 570 (bus slave controller) inserts operands into the sequence of micro instructions to form a specific sequence and then transfers the specific sequence to the test execution logic 560 (MTE) via bus 574 for perform memory testing (configuring a MTE). (See Col. 11, lines 5-20). Miner also teaches the test execution logic 560 (MTE) compares actual data obtained on a read with the expected data pattern and passes the result of each read to the test management logic 570 (bus slave controller) (processing a signal from the MTE). (Col. 11, lines 26-30). Miner teaches the testing of the memory chip 210 (ASIC) at full speed. Miner also teaches although the preceding discussion references testing of stand-alone memories (ASIC), it is now common practice to incorporate memory circuits into a more complex integrated circuit design (again, ASIC). Miner further teaches an apparatus 500 according to the present invention for testing memory circuits 510 in a microprocessor 501 (again, testing memories within an ASIC). (Col. 6, lines 49, 64-66, col. 9, lines 62-64).

Claim 44:

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Miner teaches the means limitations in the amended claim 44 in that the test management logic 570 (MTE and bus slave controller) communicates with a test controller 580 (CPU, means for testing) over the test control bus 575. Miner also teaches the test execution logic 560 (MTE, means for testing the memories) directly interfaces to the bus controller 530, the test management logic 570 and the memories 510, thereby allowing the memories 510 to be tested. (See col. 10, lines 8-15).

Claim 4:

Miner teaches the test execution logic 560 directly interfaces to the memories 510 and to the bus controller 530.

Claims 5 and 47:

Miner teaches the test execution logic 560 executes test sequences of data patterns to write and expected data patterns to read. (See col. 10, lines 49-54, col. 11, lines 12-18).

Claims 6, 34 and 48:

Miner teaches the test execution logic 560 compares actual data obtained on a read with the expected data pattern on a bit-by-bit basis. (See col. 11, lines 27-29).

Claims 7 and 36:

Miner teaches the test execution logic 560 generates addresses for specified locations in a memory. Miner also teaches the test sequences within the test management logic 570 are configurable, and they can be configured with test parameters, provided by the test controller 580, to execute accesses to any memory 510, within any address range, to read or write any data pattern. (See col. 10, lines 31, 32, 45-54). Miner also teaches that the test execution logic 560 executes test

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parameters consisting of variables to prescribe a designated memory 510 for testing, start address, address increment amount, data pattern to write, expected data pattern on a read... (See col. 11, lines 10 –18).

Claim 35:

Miner teaches the test sequences that are designed into the test management logic 570 can be configured with test parameters, provided by the test controller 580, to execute accesses to any memory 510, within any address range, to read or write any data pattern. In addition, a test sequence can be configured to repeat a specified number of times before it completes. (See col. 10, lines 49-56). Miner also teaches the test execution logic 560 compares actual data obtained on a read with the expected data pattern on a bit-by-bit basis. (See col. 11, lines 26-28).

Claims 12, 13, 40, 41, 54 and 55:

Miner teaches that the result of each read, containing a bit-by-bit result, is provided to the test management logic 570 via bus 574. The result is placed in the result register 573 for retrieval by the test controller 580. (See col. 11, lines 28-31 and col. 10, lines 56-60).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a

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person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 9, 15, 16, 19-21, 23, 25-27, 29, 31, 37, 39, 43, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miner (US-6370661 B1).

Claim 16:

Miner teaches that test management logic 570 (bus slave controller (BSC)) receives test parameters (initiation signals) from the test controller 580 (processor) to execute access to any memory (accessing memories) via the test execution logic 560 (MTE) via bus 574. (Col. 10, lines 44-54). Miner teaches in Figure 5 a single BSC and MTE accessing a plurality of memories. Miner also teaches the test execution logic 560 (MTE) directly interfaces to the memories 510 and to the bus controller 530, thereby allowing the memories 510 to be tested at full speed (MTE to execute test operations on the memory). Miner further teaches the test execution logic 560 sends a test signal 565 to the bus unit 530 to preclude contention on the local bus 532, thus effectively disabling the bus unit during testing 530. (Col. 10, lines 12-15, col. 11, lines 21-24). Miner even further teaches control logic 563 (memory controller) (note: this is part of the test execution logic 560 (MTE)) directly generates control signals over a memory control bus 564 to select and control bus a specified memory 510. (Col. 10, ll. 35-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to duplicate Miner's test management logic 570 (BSC) and test execution logic 560 (MTE) in Figure 5. The artisan would have been motivated to do so since it has been held that

mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8 (7th Cir. 1977).

Claims 2:

Miner does not explicitly teach of a second memory test engine to test a second random access memory. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the teaching of Miner can be duplicated to include a second test execution logic and test management logic entities to perform a similar function.

Claims 9, 23 and 37:

Miner teaches the test execution logic 560 generates addresses for specified locations in a memory. Miner also teaches the test sequences within the test management logic 570 are configurable, and they can be configured with test parameters, provided by the test controller 580, to execute accesses to any memory 510, within any address range, to read or write any data pattern. (See col. 10, lines 31, 32, 45-54). Miner also teaches that the test execution logic 560 executes test parameters consisting of variables to prescribe a designated memory 510 for testing, start address, address increment amount, data pattern to write, expected data pattern on a read... (See col. 11, lines 10 –18). Miner does not explicitly disclose that the address is decremented, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the configurable test sequences within the test management logic 570 that can access to any memory 510, within any address range, in an incrementing order can also decrement the address in testing the memory.

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The artisan would be motivated to do so since it is common practice in testing memories to decrement as well as increment the address locations.

Claim 19:

Miner teaches the test execution logic 560 executes test sequences of data patterns to write and expected data patterns to read. (See col. 10, lines 49-54, col. 11, lines 12-18).

Claim 20:

Miner teaches the test execution logic 560 compares actual data obtained on a read with the expected data pattern on a bit-by-bit basis. (See col. 11, lines 27-29).

Claim 21:

Miner teaches the test sequences that are designed into the test management logic 570 can be configured with test parameters, provided by the test controller 580, to execute accesses to any memory 510, within any address range, to read or write any data pattern. In addition, a test sequence can be configured to repeat a specified number of times before it completes. (See col. 10, lines 49-56). Miner also teaches the test execution logic 560 compares actual data obtained on a read with the expected data pattern on a bit-by-bit basis. (See col. 11, lines 26-28).

Claims 26 and 27:

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Miner teaches that the result of each read, containing a bit-by-bit result, is provided to the test management logic 570 via bus 574. The result is placed in the result register 573 for retrieval by the test controller 580. (See col. 11, lines 28-31 and col. 10, lines 56-60).

Claims 15, 29, 43, 57:

Miner teaches the test execution logic 560 compares actual data obtained on a read with the expected data pattern. Any detected defects are represented by a mask bit (logical "1") and placed in the result register 573 for retrieval by the test controller 580. (See col. 11, lines 24-31, 44, 45). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the mask bit set in the result register alerts the test controller of the mismatch and alters operation.

Claim 31:

Miner does not explicitly teach of a plurality of memory test engines to test a random access memory. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the teaching of Miner can be duplicated to include a plurality of test execution logic and test management logic entities to perform a similar function. The artisan would have been motivated to do so because duplicate parts for multiple effects depend on the necessity of time saving for testing the memories.

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5. Claims 3 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miner (US-6370661 B1) and further in view of Satoh (US-6501690 B2).

Claims 3 and 18:

Miner does not explicitly teach that the test execution logic performs testing concurrently. However, Miner does teach the test execution logic 560 generates addresses for specified locations in a memory. Miner also teaches the test sequences within the test management logic 570 are configurable, and they can be configured with test parameters, provided by the test controller 580, to execute accesses to any memory 510, within any address range, to read or write any data pattern. (See col. 10, lines 31, 32, 45-54). Miner also teaches that the test execution logic 560 executes test parameters consisting of variables to prescribe a designated memory 510 for testing, start address, address increment amount, data pattern to write, expected data pattern on a read... (See col. 11, lines 10 –18). Satoh teaches of a method for diagnosing a memory array including a plurality of memory banks, which can independently read/write data by writing identical data in parallel. This method also reads out storage data and compares the data read out to the data that was written. According to the above method, the memory including the plurality of banks can be diagnosed at one time or concurrently. (See col. 1, 43-48, 54, 55). Satoh also teaches the memory diagnostic circuit controls the memory banks to collectively write data at one time, and the comparison circuit compares the written data and the data from the memory banks. In this structure, the plurality of memory banks can be diagnosed at one time. (See col. 2, lines 6-12). Also, in the memory diagnostic circuit 11 of this embodiment, the plurality

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of memories 14a to 14d, which are divided into four memory banks, can collectively be diagnosed at one time. (See col. 5, lines 65-67, col. 6, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to "reconfigure" the test sequences within the test management logic of Miner to test the memories concurrently in view of the teachings of Satoh. Specifically, the control logic within the test execution logic directly generates control signals over a memory control bus to select and control a specified memory. The artisan would have a motivation to do so because Miner suggests that the test controller can access many memories (see col. 10, lines 49-54) which would be more than one memory.

6. Claims 14, 28, 42, 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miner (US-6370661 B1) and further in view of Chambers et al. (US-20020078408 A1).

Claims 14, 28, 42, 56:

Miner teaches that the test controller 580 generates a defect map and determine the correct way to repair the array. (Col. 10, lines 58-60). Chambers teaches of an error register which indicates that when errors exist, the computer system interrogates the error register at step 1120 and retrieves the stored contents of the read registers (step 1130). At this point, the test procedure terminates in a FAIL (step 1150). (Page 3, paragraph 32). It would have been obvious to one of ordinary skill in the art at the time the invention was made that to terminate the testing procedure upon encountering an

error to create a defect map. The artisan would have been motivated when creating the defect map of Miner the test procedure would terminate in a fail as taught in Chambers.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

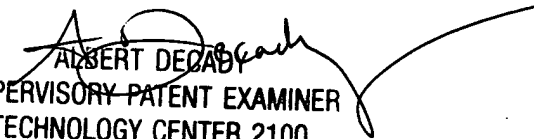
Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Tabone, Jr. whose telephone number is (571) 272-3827. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


John J. Tabone, Jr.
Examiner
Art Unit 2133
6/24/05


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